

## **AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1-14. (canceled)

Claim 15. (original) A system for manufacturing a one-piece closed-shape structure using a mandrel, comprising:

- a preparing component configured to prepare the mandrel, wherein the mandrel comprises a bag and an armature;
- a first applying component configured to apply a frame mandrel to the mandrel to form a frame for the structure;
- a first filling component configured to fill the mandrel and the frame mandrel with media;
- a second applying component configured to apply a curable resin to a fiber;
- a third applying component configured to apply the fiber over the mandrel and frame mandrel to form the structure;
- a curing component configured to cure the structure;
- a removing component configured to remove the media from the mandrel and frame mandrel; and
- an extracting component configured to extract the mandrel and frame mandrel from the structure.

Claim 16. (original) The system of claim 15, wherein the preparing component further comprises:

- a placing component configured to place the armature through the bag; and
- a first conforming component configured to conform the shape of the bag to a desired shape of the structure.

Claim 17. (original) The system of claim 16, wherein the first conforming component further comprises:

a sealing component configured to seal the bag;

a placing component configured to place the armature and the bag in a form tool; and

a second conforming component configured to conform the shape of the bag to the form tool.

Claim 18. (original) The system of claim 17, wherein the second conforming component further comprises:

a second filling component configured to fill a space between the armature and the bag with air; and

a creating component configured to create a vacuum between the form tool and the bag to force the bag to conform to the shape of the form tool.

Claim 19. (original) The system of claim 15, wherein the first applying component further comprises:

a fourth applying component configured to apply a frame ply to an exterior of the bag; and

a fifth applying component configured to apply the frame mandrel over the frame ply.

Claim 20. (original) The system of claim 15, wherein the filling component further comprises a compacting component configured to compact the media.

Claim 21. (original) The system of claim 20, wherein the compacting component further comprises a vibrating component configured to vibrate the mandrel and frame mandrel to aid compaction.

Claim 22. (original) The system of claim 15, wherein the third applying component further comprises:

a first winding component configured to wind the fiber over the mandrel and frame mandrel to form the structure.

Claim 23. (original) The system of claim 22, wherein the first winding component further comprises:

a first placing component configured to place a first winding aid on the bag;

- a second winding component configured to wind the fiber over the first winding aid, the frame mandrel, and the mandrel to form an inner skin;
- a first cutting component configured to cut the inner skin to remove the first winding aids;
- a second placing component configured to place a second winding aid on the inner skin;
- a third winding component configured to wind the fiber over the second winding aid and inner skin to form an outer skin; and
- a second cutting component configured to cut the outer skin to remove the second winding aids.

Claim 24. (original) The system of claim 23, wherein the second placing component further comprises a third placing component configured to place a core piece on the inner skin.

Claim 25. (original) The system of claim 15, wherein the curing component further comprises:

- a first placing component configured to place a mold around an exterior of the structure;
- a sealing component configured to seal the mold;
- a second placing component configured to place the mold in a heating device; and
- a heat applying component configured to apply heat to the mold using the heating device.

Claim 26. (original) The system of claim 25, wherein the curing component further comprises:

- a first creating component configured to create a vacuum in the mandrel; and
- a second creating component configured to create a vacuum in the frame mandrel.

Claim 27. (original) The system of claim 15, wherein the curing component further comprises:

- a first placing component configured to place a mold around an exterior of the structure;
- a sealing component configured to seal the mold;
- a second placing component configured to place the mold in an autoclave; and
- a pressure applying component configured to apply pressure to the mold using the autoclave.

Claim 28. (original) The system of claim 15, wherein the structure is a fuselage of an aircraft.

Claim 29. (canceled)

Claim 30. (original) A system for manufacturing a one-piece closed-shape structure using a mandrel, comprising:

- a preparing means for preparing the mandrel, wherein the mandrel comprises a bag and an armature;
- an applying means for applying a frame mandrel to the mandrel to form a frame for the structure;
- a filling means for filling the mandrel and the frame mandrel with media;
- a first applying means for applying a curable resin to a fiber;
- a second applying means for applying the fiber over the mandrel and frame mandrel to form the structure;
- a curing means for curing the structure;
- a removing means for removing the media from the mandrel and frame mandrel; and
- an extracting means for extracting the mandrel and frame mandrel from the structure.

Claims 31-44. (canceled)

Claim 45. (original) A system for manufacturing a one-piece closed-shape structure, using a mandrel comprising:

- a preparing component configured to prepare the mandrel, wherein the mandrel comprises a bag and an armature;

- a first placing component configured to place the armature through the bag;
- a first conforming component configured to conform the shape of the bag to a desired shape of the structure;
- a first applying component configured to apply a frame mandrel to the mandrel to form a frame of the structure;
- a first filling component configured to fill the mandrel and the frame mandrel with media;
- a second applying component configured to apply a curable resin to a fiber;
- a third applying component configured to apply the fiber over the frame mandrel and the bag to form an inner skin;
- a second placing component configured to place a core piece on the inner skin;
- a fourth applying component configured to apply the fiber over the core piece and inner skin to form an outer skin;
- a third placing component configured to place a mold around an exterior of the structure;
- a curing component configured to cure the structure in the mold;
- a first removing component configured to remove the mold from the structure;
- a second removing component configured to remove the media from the mandrel and the mandrel frame;
- a first extracting component configured to extract the armature from the bag; and
- a second extracting component configured to extract the bag from the structure.

Claim 46. (original) The system of claim 45, wherein the first conforming component further comprises:

- a sealing component configured to seal the bag;

a fourth placing component configured to place the armature and the bag in a form tool; and

a second conforming component configured to conform the shape of the bag to the form tool.

Claim 47. (original) The system of claim 46, wherein the second conforming component further comprises:

a second filling component configured to fill a space between the armature and the bag with air; and

a creating component configured to create a vacuum between the form tool and the bag to force the bag to conform to the shape of the form tool.

Claim 48. (original) The system of claim 45, wherein the first applying component further comprises:

a fifth applying component configured to apply a frame ply to an exterior of the bag; and

a sixth applying component configured to apply a frame mandrel over the frame ply.

Claim 49. (original) The system of claim 45, wherein the first filling component further comprises a compacting component configured to compact the media.

Claim 50. (original) The system of claim 49, wherein the compacting component further comprises a vibrating component configured to vibrate the mandrel and frame mandrel to aid compaction.

Claim 51. (original) The system of claim 45, wherein the third applying component comprises:

a first winding component configured to wind the fiber over the frame mandrel and the bag to form the inner skin.

Claim 52. (original) The system of claim 51, wherein the first winding component further comprises:

a fourth placing component configured to place a winding aid on the bag;

a second winding component configured to wind the fiber over the frame mandrels, the winding aid, and the bag to form the inner skin; and

a cutting component configured to cut the inner skin to remove the winding aid.

Claim 53. (original) The system of claim 45, wherein the fourth applying component comprises:

a first winding component configured to wind the fiber over the core piece and inner skin to form the outer skin.

Claim 54. (original) The system of claim 53, wherein the first winding component further comprises:

a fourth placing component configured to place a winding aid on the inner skin;

a second winding component configured to wind the fiber over the core piece, the winding aid, and the inner skin to form an outer skin; and

a cutting component configured to cut the outer skin to remove the winding aid.

Claim 55. (original) The system of claim 45, wherein the curing component further comprises:

a sealing component configured to seal the mold;

a fourth placing component configured to place the mold in a heating device; and

a heat applying component configured to apply heat to the mold using the heating device.

Claim 56. (original) The system of claim 55, wherein the curing component further comprises:

a first creating component configured to create a vacuum in the mandrel; and

a second creating component configured to create a vacuum in the frame mandrel.

Claim 57. (original) The system of claim 45, wherein the curing component further comprises:

a sealing component configured to seal the mold;

a fourth placing component configured to place the mold in an autoclave;  
and

a pressure applying component configured to apply pressure to the mold  
using the autoclave.

Claim 58. (original) The system of claim 45, wherein the one-piece closed-shape structure is an airplane fuselage.

Claim 59. (canceled)

Claim 60. (original) A system for manufacturing a one-piece closed-shape structure, using a mandrel comprising:

a preparing means for preparing the mandrel, wherein the mandrel  
comprises a bag and an armature;

a first placing means for placing the armature through the bag;

a conforming means for conforming the shape of the bag to a desired  
shape of the structure;

a first applying means for applying a frame mandrel to the mandrel to form  
a frame of the structure;

a filling means for filling the mandrel and the frame mandrel with media;

a second applying means for applying a curable resin to a fiber;

a third applying means for applying the fiber over the frame mandrel and  
the bag to form an inner skin;

a second placing means for placing a core piece on the inner skin;

a fourth applying means for applying the fiber over the core piece and  
inner skin to form an outer skin;

a third placing means for placing a mold around an exterior of the  
structure;

a curing means for curing the structure in the mold;

a first removing means for removing the mold from the structure;

a second removing means for removing the media from the mandrel and  
the mandrel frame;



a first extracting means for extracting the armature from the bag; and  
a second extracting means for extracting the bag from the structure.

Claims 61-67. (canceled)

FINNEGAN  
HENDERSON  
FARABOW  
GARRETT &  
DUNNER LLP

1300 I Street, NW  
Washington, DC 20005  
202.408.4000  
Fax 202.408.4400  
[www.finnegan.com](http://www.finnegan.com)